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ABSTRACT

This paper describes a prototype of a development project for practicum classes in the Hong Kong Institute of Education. An in-house development of a streaming video system is used for improving student teaching by building a digitized video database from a variety of sources. The main objective is to develop an interactive web-based video platform for critical analysis of significant classroom activities and events related to information technology (IT) teaching skills and strategies. In designing the video system, Synchronized Multimedia Integration Language (SMIL) is used. Video clips can be synchronized and displayed in parallel with text clips showing the teaching sequences and key ideas. Viewing and critiquing the videos side by side in an online setting is the key learning strategy that provides opportunities to develop student teachers' reflective thinking skills and interactive reflections with their classmates through online forum discussions. Includes four figures. (Author)

# Using Streaming Technology to Build Video-Cases that Enhance Student Teaching on IT



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**Abstract:** This paper describes a prototype of a development project for practicum classes in the Hong Kong Institute of Education. An in-house development of a streaming video system is used for improving student teaching by building a digitized video database from a variety of sources. The main objective is to develop an interactive web-based video platform for critical analysis of significant classroom activities and events related to IT teaching skills and strategies. In designing our video system, Synchronized Multimedia Integration Language (SMIL) is used. Video clips can be synchronized and displayed in parallel with text clips showing the teaching sequences and key ideas. Viewing and critiquing the videos side by side in an on-line setting is the key learning strategy that provides opportunities to develop student teachers' reflective thinking skills and interactive reflections with their classmates through on-line forum discussions.

## Introduction

In the practicum and methods classes, the student teachers usually conduct trial or experimental lessons that are prepared, taught, and then collectively critiqued. Each period can only highlight a different teaching skill and edited video tapes are sometimes used to supplement for any classroom practice. Recently, there are trends of reducing the contact hours and increasing of class size in IT practicum and methods classes. Within these classroom constraints, teaching skills taught, variety of classroom situations observed as well as number of participating student teachers are limited. The proposed interactive web-based video platform for critical analysis of significant classroom activities will provide repertoires of specific teaching skills as well as diverse classroom situations. Because of the 24-hour availability and accessibility of these videos, student teachers can achieve extensive field experiences prior to teaching practices. Researches (Risko, 1991; Stephens & Leavell, 1999) suggest that viewing video cases student

teachers are able to examine the dynamics of school classrooms and benefit from multiple perspectives when viewing is done collectively with classmates or other colleagues in the faculty. Stephens & Leavell (1999) also reported that video minicases which are short vignettes selected as examples of teaching practice can greatly enhance student teachers instruction ability since the vignettes are purposefully selected. Accordingly, student teachers are able to compare their interpretations with those of others when viewing the same video case or similar vignettes.

## System Overviews

Traditionally, student teachers can reflect on their own teaching performance or analyse other practicing teachers' performance through videotapes with paper-based observation forms. Preset questions are usually provided for the analysis of the teaching sequences against the intended objectives, designated activities and learning outcomes. The disadvantages of this approach include the following:

1. Physical videotapes are bulky in handling and viewing;
2. It is difficult to annotate important teaching characteristics onto the videotapes;
3. Searching similar characteristics from the repository of related videotapes are not easy; and
4. Critical reflection by student teachers cannot be easily done visually and interactively;

Furthermore, video vignettes can only be produced in video segments which cannot be retrieved or managed easily. Therefore, a digital solution with online viewing, searching and critiquing is highly desirable. Figure 1 illustrates a schematic representation of our desirable system. A video case can be viewed alongside with key ideas explained. Hyperlinks for related video clips or websites to support the topics of interests are timely provided. Critical reflections related to the video segments can be collected.

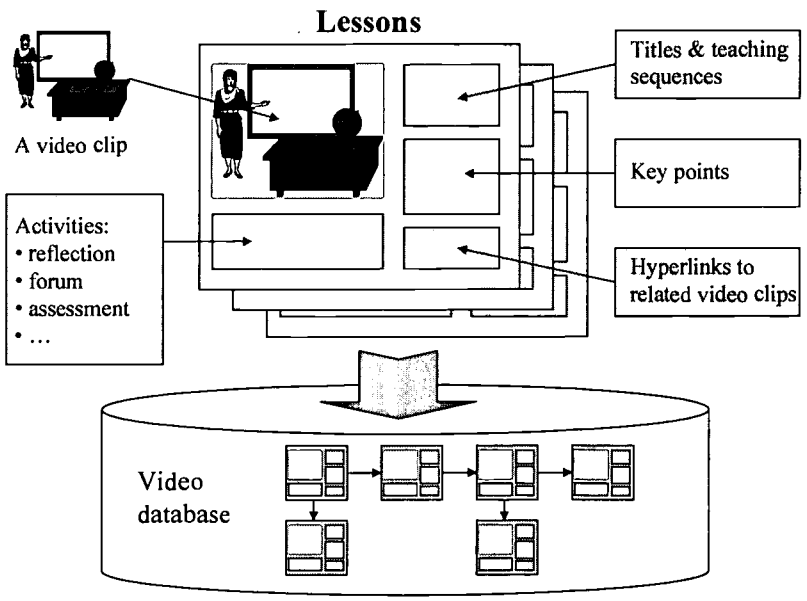


**Figure 1. A Schematic Representation of the Video System**

In designing our video system, Synchronized Multimedia Integration Language (SMIL) is used (Alesso, 2000; Kennedy, 2002; Williamson, 2001). SMIL is ideal to our application. Video clips can be synchronized and displayed in parallel with other media information. In conjunction with a streaming server, video cases can be retrieved over the Internet. Figure 2 shows our prototype using SMIL and its related technologies. A student teacher conducts teaching in a practicum class. The four teaching sequences, namely *introduction*, *motivation*, *development* and *consolidation*, can be viewed serially or in any order by clicking the links. Key points are further explained and annotated. Also, if there are existed other video segments related to the key points, hyperlinks are provided for easy access. Figure 3 shows the related clip with the student teacher, Chan TS, after clicking on the item on Figure 2. Student teachers can also enter into the forum for critical reflection at any time as shown in Figure 4.

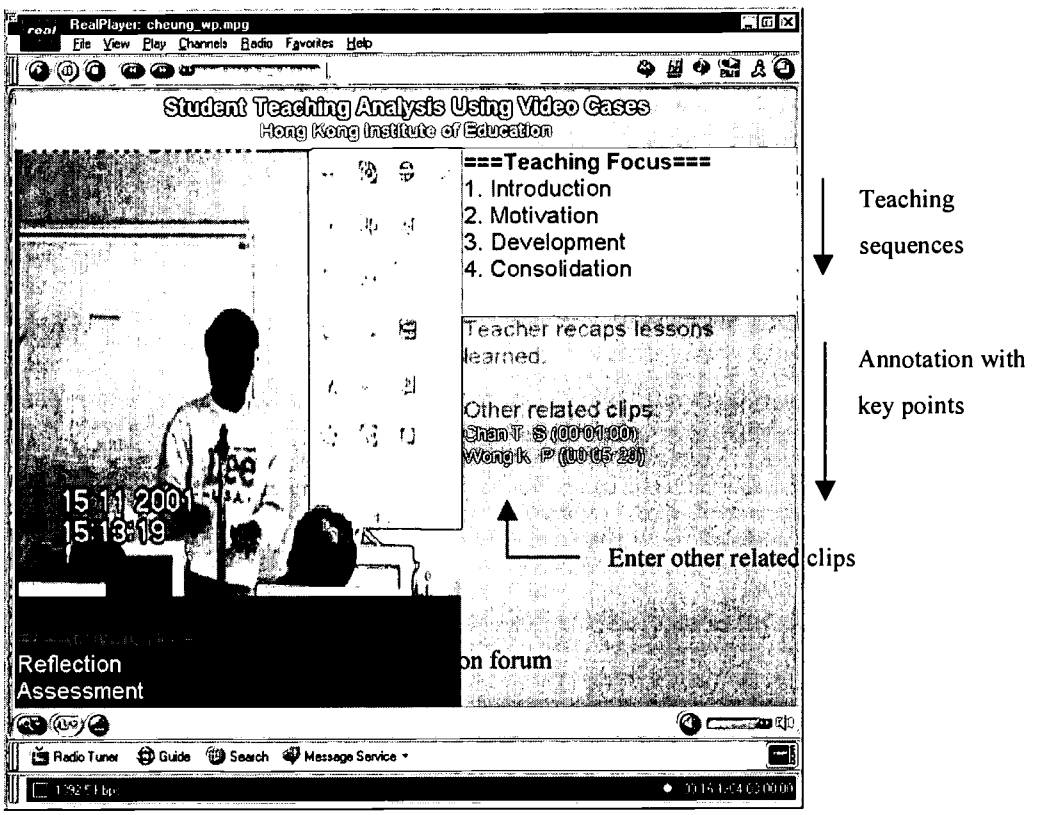


**Figure 2. A Sample Screen Shot for our Prototype**

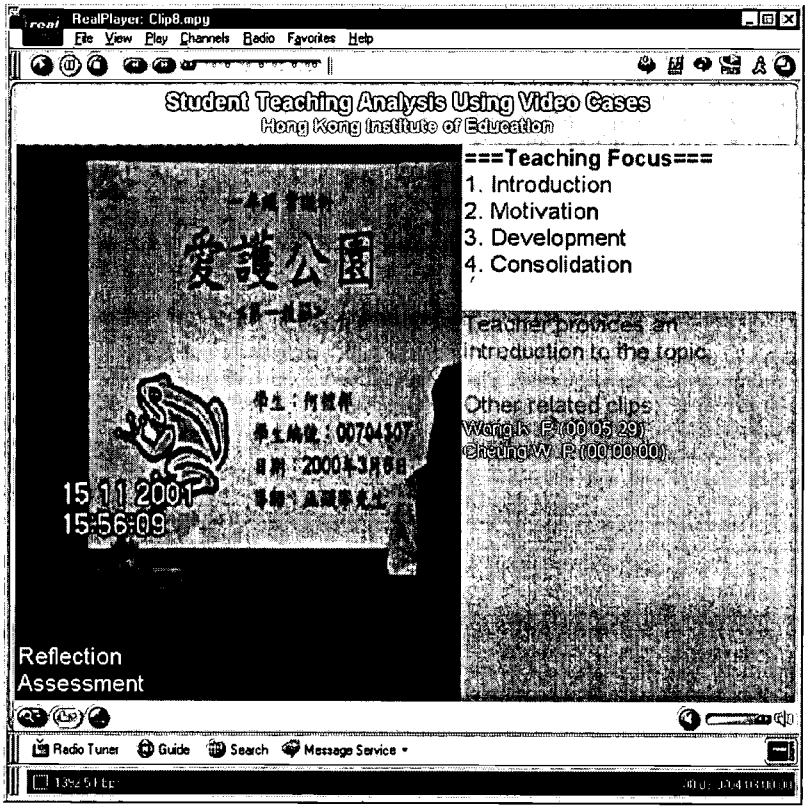


**Figure 3. A Sample Screen shot from Selecting "Chan TS" on Figure 2**

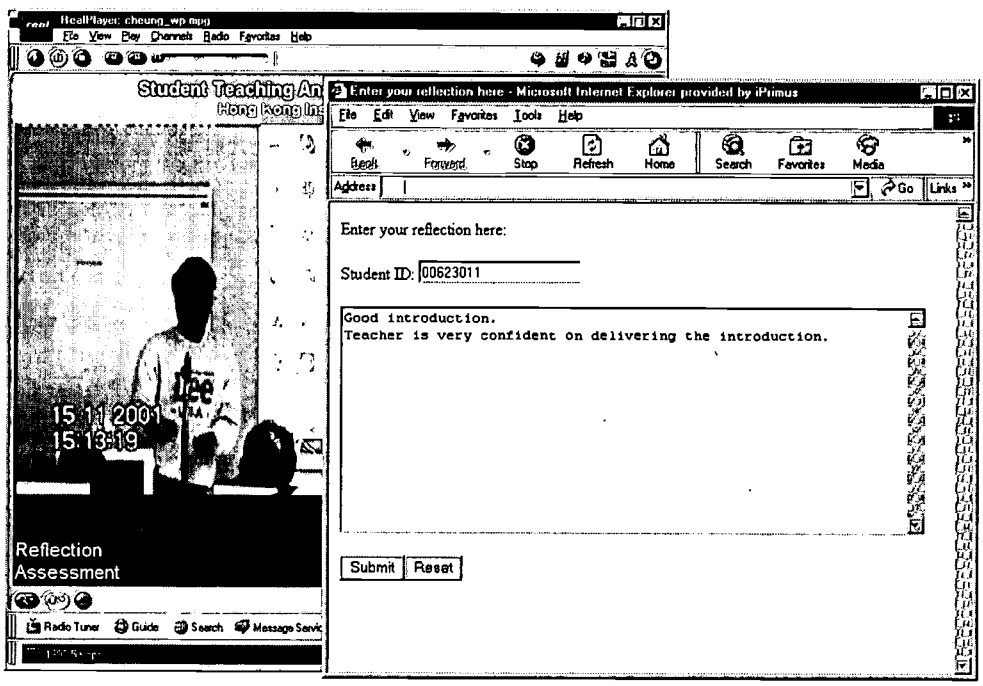


**Figure 4. A Sample Screen shot with Critical Reflection**

Using streaming technology to build the video cases, the advantages of our system are the following:

1. The video cases can be viewed online;
2. We can directly and effectively index into any portion of the video clips in our repository;
3. One can easily control the timeline and important points can be re-visited at ease;
4. We do not need to split and/or merge clips into a single clip for the teaching and learning purpose; and
5. Video stream can retrieve without long delay over the Internet.

Furthermore, by responding to the on-line reflective forum, the student teachers can thoughtfully examine effective teaching principles and practices of each video case. Viewing and critiquing the videos side by side in an on-line setting is the key learning strategy that provides opportunities to develop student teachers' reflective thinking skills and interactive reflections with their classmates. Unlike any class discussions, viewing videos in a detachment setting, student teachers can independently develop their own reflections about a specific teaching skill and then argue with their peers in the web-based discussion forum.

## Conclusion and Future Work

The proposed system allows student teachers to reflect on any key events posed in the video cases as well as to link the theory into the practice more coherently. The flexibility of our system is apparent in comparison to the conventional approach of analysing videotapes for teaching practice.

Our future work on this system is to build another "meta" database which can assist us to generate the content of video cases dynamically. By using structured information of the database, we can automatically compose SMIL scripts and related files on-demand.

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